

2020 Year 10 Topic Tests Information Sheet

2020 Year 10 Topic Tests is a set of short answer questions and their solutions.

The topics covered are:

- Patterns and Algebra (7 questions)
- Linear and non-linear relationships (6 questions)
- Measurement and Geometry (5 questions)
- Trigonometry (4 questions)
- Probability (4 questions)
- Statistics (5 questions)

2020 Year 10 Topic Tests also includes a **mid-year test** that consists of:

- 15 multiple choice questions
- 5 short answer questions
- 2 extended response questions

Please also note the following information.

Distribution

We will email zipped copies to you

File format

MS Word docx format (compatible with word 2007/2010/2013/2016)

Sample

We have attached sample questions below

Release date

1st of March 2020

Price

\$100

**2020 Year 10 Mathematics
Patterns and Algebra Test**

**Time allowed: 1 hour
Total marks: 40 marks**

Question 1 (6 marks)

a. Write 35% as a decimal.

1 mark

b. List all prime factors of 65.

1 mark

c. Evaluate $\frac{(4-6)^3}{-2^2} + 1$.

1 mark

d. Solve each of the following equations:

i. $-8 - 2x = 4$

1 mark

ii. $\frac{3x+6}{2} = x+2$.

2 marks

Question 5 (6 marks)

- a.** Find how many years it will take to earn \$1800 of interest if \$6000 is invested at a simple interest rate of 5% per annum. 1 mark

- b.** \$15 720 is invested at the rate of 5% per annum, compounding annually. 2 marks
What will the value of the investment be at the end of the first 3 years?

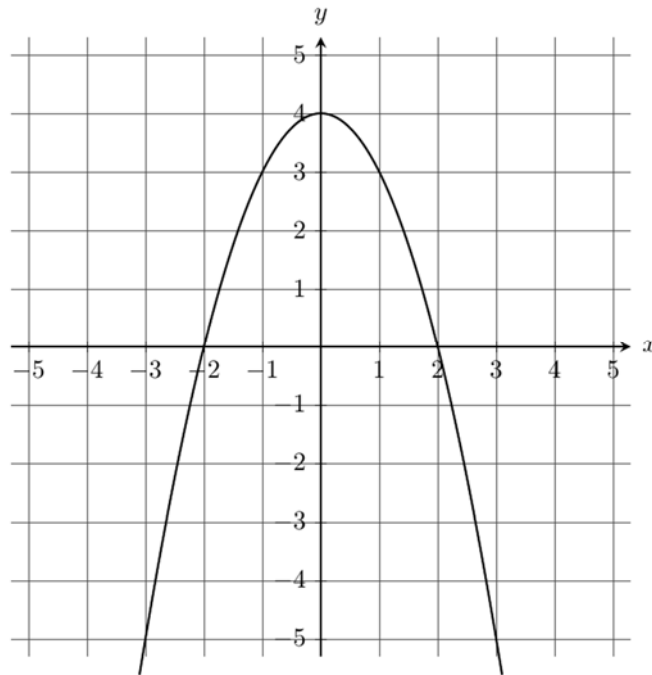
- c.** Samuel is 11 years older than his brother. In 7 years time, Samuel will be twice his brother's age. 3 marks
What are the present ages of Samuel and his brother?

Question 2 (5 marks)

a. Find the equation of each of the following graphs.

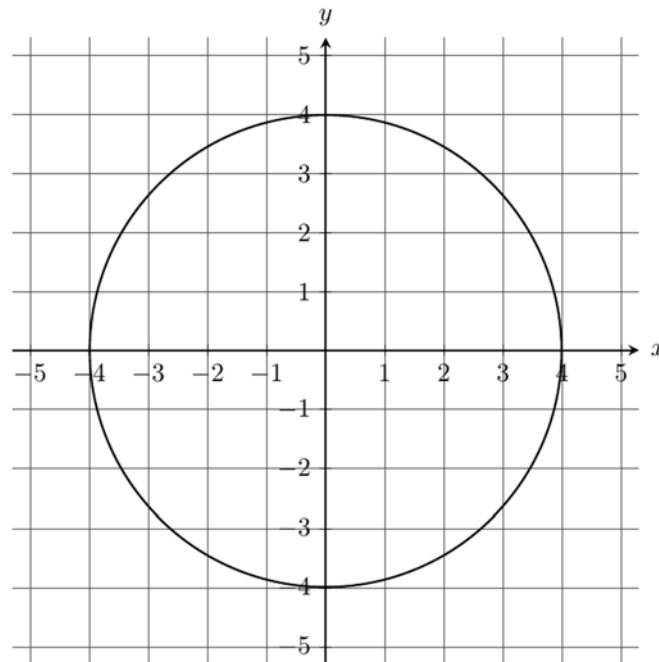
i.

1 mark



ii.

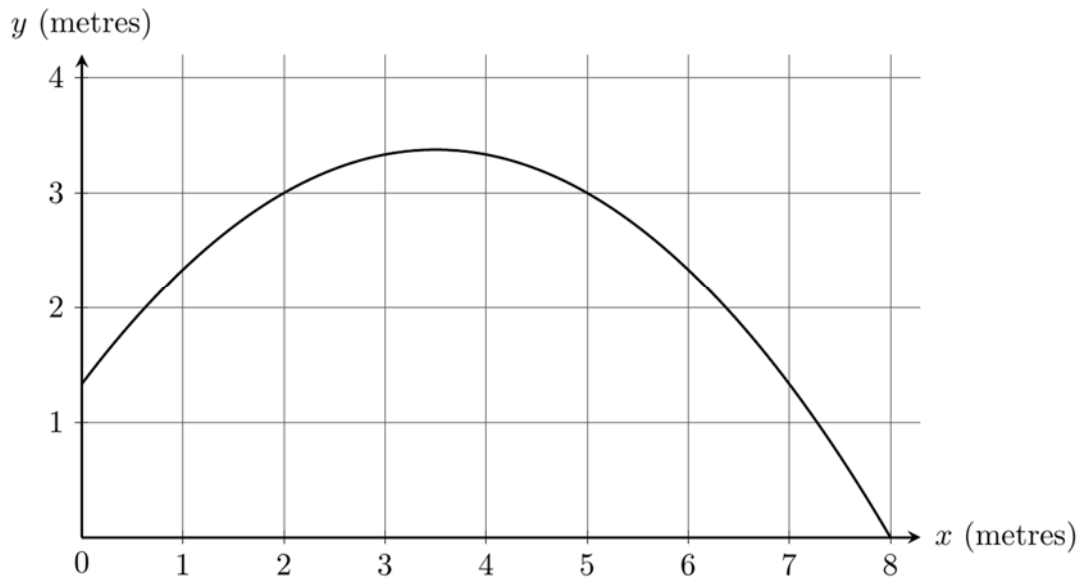
1 mark



Question 4 (8 marks)

Dylan kicked a ball from flat ground.

The following graph shows the height of the ball above the ground.



x is the horizontal distance that the ball travelled, in metres, away from Dylan.

y is the height of the ball above the ground in metres.

The graph has the equation $y = \frac{(x+1)(8-x)}{6}$.

a. Find the initial height of the ball.

1 mark

Round your answer to one decimal place.

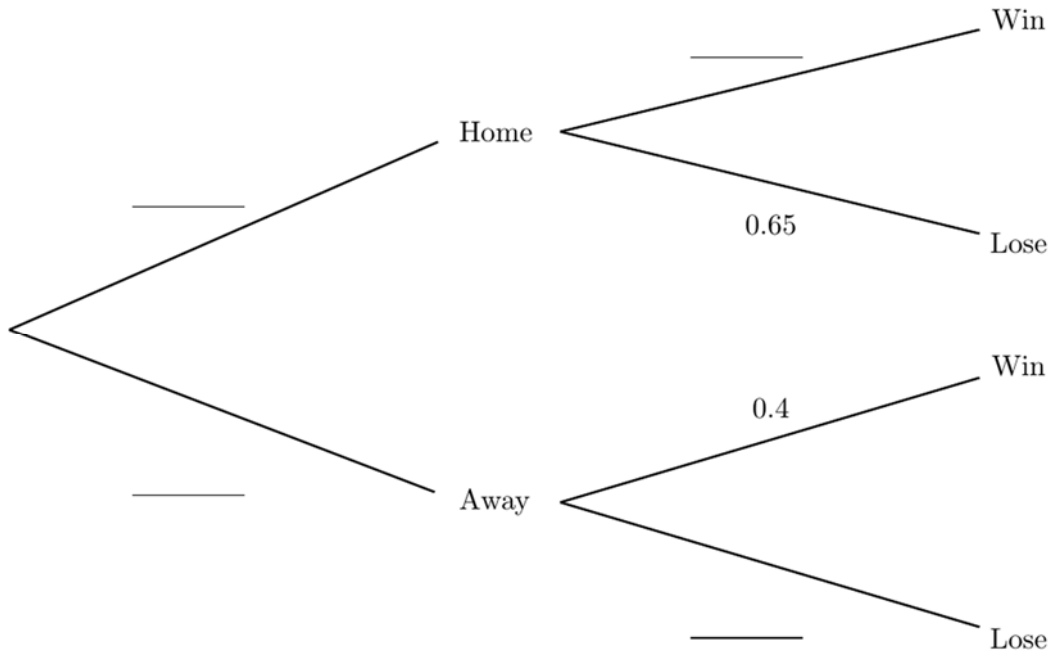
b. Show that the equation of the graph can be written as $y = -\frac{x^2 - 7x - 8}{6}$.

2 marks

Question 3 (10 marks)

Lachlan's soccer team plays 45% of their games away from home.
When playing away from home, they win 40% of their games.
On the other hand, they lose 65% of their games when they play at home.

a. Complete the tree diagram below for the outcome of the team's next game. 4 marks



b. Show that the probability that Lachlan's team loses the next game is 0.6275. 2 marks

c. Find the probability that Lachlan's team wins the next game. 2 marks



2020 YEAR 10 MATHEMATICS

MIDYEAR TEST

Reading time: 15 minutes

Writing time: 2 hours

QUESTION BOOK

Structure of book

Section	Number of questions	Number of questions to be answered	Number of marks
A	15	15	15
B	5	5	25
C	1	1	10
			Total 50

SECTION A

Instructions for Section A

Answer **all** questions.

Choose the response that is **correct** for the question.

A correct answer scores 1, an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question.

Question 1

$(\sqrt{4} + 14) \div 2^3$ simplifies to

- A. 0.5
- B. 1
- C. 2
- D. 4
- E. 8

Question 2

Which one of the following is **not** an integer?

- A. -4
- B. 4.25
- C. $\sqrt[3]{27}$
- D. 0
- E. $\frac{3^2}{3}$

Question 3

On average, Katie can proofread 4 pages of paperwork per hour.

Which of these is the closest to the time, in minutes, in which she can proofread 100 pages?

- A. 0.42
- B. 25
- C. 400
- D. 1 500
- E. 24 000

Question 4

What is the solution to the equation $1 - 3x = \frac{3x - 7}{2}$?

- A. $x = 1$
- B. $x = -1$
- C. $x = 3$
- D. $x = 4$
- E. $x = 9$

SECTION B

Instructions for Section B

Answer **all** questions.

In all questions where a numerical answer is required, an **exact** value must be given unless otherwise specified.

In questions where more than one mark is available, appropriate working **must** be shown.

Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

Question 1 (5 marks)

- a. Write the numbers -4 , π , 2.4 , $-\sqrt{6}$ in order, from the smallest to the largest. 1 mark

- b. What is the closest integer to $\frac{\sqrt{100}}{(3+2)^2}$ in value? 1 mark

- c. Simplify $-3x \times (-5x) - 2(3x + 2)$. 1 mark

- d. For the rule $2x + y = 10$, where x and y are integers, complete the table below. 1 mark

x	1	2	3	4	5
y		6			

- e. What is the radius of the circle whose area is 2020 cm^2 ? 1 mark
Round your answer to two decimal places.

2020 Year 10 Mathematics
Trigonometry Test

Question 1 (8 marks)

a. 1 mark
90 or ninety (A1)

b. 1 mark
1 (A1)

c. 1 mark
distance = $3 \times (2 \times \pi \times 62)$
 ≈ 1169 cm (A1)

d.
i. hypotenuse (A1) 1 mark

ii. 2 marks
 $AB^2 + BC^2 = 1^2 + \sqrt{3}^2$ (A1)
 $= 1 + 3$
 $= 2^2$
 $= AC^2$ (A1)

iii. 2 marks
 $\sin(30^\circ) = \frac{AB}{AC}$ (A1)
 $= \frac{1}{2}$ (A1)

Question 3 (10 marks)

a. 2 marks

The scatter plot shows that the correlation is reasonably strong. (A1)
(as the upward trend in the data is reasonably clear)

The scatter plot shows that the correlation is positive. (A1)
(as the mathematics marks increase, the physics marks increase)

- Accept the use of wording “association”, instead of correlation.

b. 2 marks

The point (45,34) could be an outlier, as it clearly deviates from the rest of the data values and the trend line.

- Location of the potential outlier point. (A1)
- Justification in reference to the scatter plot. (A1)

c. 2 marks

The scatter plot shows that the line crosses the vertical axis at 30. (A1)

Taking the points (50,60) and (0,30)

$$\text{slope} = \frac{60-30}{50-0} = 0.6 \quad (\text{A1})$$

Therefore, the equation of the line of best fit is $\text{physics} = 30 + 0.6 \times \text{mathematics}$.

d. 2 marks

$$\begin{aligned} \text{physics} &= 30 + 0.6 \times 70 \quad (\text{A1}) \\ &= 72 \quad (\text{A1}) \end{aligned}$$

e. 2 marks

Any reasonable points such as:

- A sample size of just 25 students may be too small to build a meaningful model.
- The physics exam may not have been that mathematical, therefore not quite capturing the relationship between the students’ mathematics and physics abilities.
- This model may not be applicable for students across all faculties/departments. Some variations are expected, as science students are likely to be stronger in mathematics and physics than fine arts students, for example.
- The trend may not be linear.

- A valid statement (A1) and justification (A1)